

Glossary

“A” horizon - the surface layer or topsoil; the dark and generally loose and crumbly layer which contains higher amounts of organic matter

acre - a piece of land containing 43,560 square feet. (example: a parcel 150 feet wide and 290.4 feet long is one acre)

adaptation - the process of making adjustments to the environment

aggregates - hard materials such as sand, gravel, or crushed stone, used for mixing with a cementing material to form concrete; or used alone as fill

air exchange - process by which plants can remove chemicals from the air and produce “clean” oxygen

air pollution - any visible or invisible particle or gas found in the air that is not part of its normal composition

aquaculture - raising fish on a farm

aquifer - geologic formation which contains usable amounts of groundwater that can be accessed from a well or spring

“B” horizon - subsoil; a light colored, dense layer which contains higher amounts of clay

best management practice (BMP) - a method of working the land that minimizes the impacts of disturbance and thus conserves soil and water resources

biological diversity (or biodiversity) - the variety and complexity of species present and interacting in an ecosystem and the relative abundance of each

biodegradable - capable of being broken down by air, water, and bacteria

biomass - the total weight (mass) of all living matter in a particular habitat or area

biota - the animal and plant life of a region or period

biotechnology - the use of technology to create bigger and better plants and animals

“C” horizon - parent material

cambium - a thin layer of living dividing cells just under the bark of trees; this layer gives rise to the tree's secondary growth

carrying capacity - a wildlife management term for an equilibrium expressed by the availability of habitat components and the number of animals in a given area. In general ecological usage, carrying capacity is the dynamic equilibrium established between a life form and its environment. It is frequently expressed as a number indicating the population of any animal a given area can support. Carrying capacity varies throughout the year. The population number varies from year to year, depending upon conditions within the habitat such as rainfall. There may be a difference between the ecological carrying capacity of a given area and the cultural carrying capacity of an area. The cultural carrying capacity is the number of a given species of animal that the human community will tolerate. This number is generally lower than the actual carrying capacity of the land.

cellulose - a complex carbohydrate that constitutes the chief part of the cell walls of higher plants and yields fiber for many products

clear-cut - a method of harvest in which all trees in a given area are removed, and the area is then replanted or allowed to regenerate; this method is usually used with shade-tolerant species

closed-loop recycling - the act of collecting, remaking, and purchasing the remade material which can be used and re-collected again

compost - partially decomposed organic matter

compound leaf - a leaf that is subdivided into many leaflets; a leaf that is comprised of a single leaf blade is a “simple leaf”

conifer - a plant that bears its seeds in cones

conservation - the care and protection (wise use) of natural resources from loss and waste. (example: actions that prevent soil erosion)

contaminant - an item that is not recyclable found in a load of recyclables, making the load unable to be recycled

contour farming - strips of plowed land located next to strips of grassland; a practice used to control water run-off and soil erosion

deciduous (adj.) - describes a plant that periodically (typically in autumn) loses all its leaves; most North American broadleaf trees are deciduous; a few conifers, such as the larch and cypress, are also deciduous

diversity - variety; an ecosystem must contain a variety of plant and animal life to be healthy. An ecosystem with few species is not as healthy or dynamic as an ecosystem with a diversity of species.

dump - location where garbage is just dumped; not to be confused with a sanitary landfill where garbage is processed properly

ecology - interrelationships between organisms and their environment

ecosystem - a natural unit that includes living and nonliving parts interacting to produce a stable system in which the exchange of materials between the living and nonliving parts follow closed paths; all living things and their environment in an area of any size will all be linked together by energy and nutrient flow

eelgrass - a rooted underwater grass type plant

emissions - electrons discharged into the air from a surface

environment - the conditions under which an organism lives

enviroshopping - a strategy used to make wiser shopping decisions that results in less trash being produced

erosion - wearing down or washing away of soil and land surface by the action of wind, water, or ice

escarpment - a long cliff or steep slope facing in one direction that separates two relatively level surfaces; produced by erosion or faulting

feed - food given to farm animals for growth, energy, and nourishment. Example: hay, corn, and oats.

fertilizer - plant food applied to the soil for plants to use for nourishment and growth

fiber - plant or animal products used to make clothing, paper, homes, and furniture. Example: cotton, timber, and wool.

geology - the study of the earth and its history, and the processes and forces which are constantly changing its face

grass strips - strips of grass between cultivated areas that are left to control water run-off

groundwater - water stored under ground that most people depend upon to drink

habitat - the arrangement of food, water, shelter or cover, and space suitable to an animal's needs. It is the "life range" which must include food and water as well as escape cover, winter cover, and cover to rear young.

hardwood - a deciduous or broadleaf tree; also applies to the wood from such trees

hazardous material - an item that is harmful to the environment

heartwood - the older, harder, nonliving central portion of wood of some trees that is usually darker, denser, less permeable, and more durable than the surrounding sapwood; many trees do not form a true heartwood

horizon - a layer of soil with similar physical and chemical properties

igneous - describes a rock or mineral that solidified from molten or partly molten material

indoor air pollution - an invisible or odorless form of gaseous chemicals emitted from furnishings and objects and trapped in poorly ventilated buildings; includes tobacco smoke, dust, paint thinner, cleaners, pesticides, radon gas, smoke from wood burning fireplaces, and chemicals from personal care products; chemicals used in the manufacturing of furniture, paint, carpeting, ink on printed materials, plastic, and dry cleaning solutions that are emitted and can cause headaches, drowsiness, and irritation of the eyes, nose, and throat

infiltration rate - the rate that rainfall soaks into the soil surface

interdependencies - the relationships of wildlife to one another and with the various elements of their environment

karst - describes the topography formed over certain rock types by dissolution. It is characterized by sink-holes caves, and underground streams.

latex - a sap from trees; used to make rubber or plastic products such as tires, gloves, and paint

leaching - the loss of materials caused by water carrying them deeper into the soil profile

leaf litter - a layer of decaying plant matter (such as leaves, twigs, grasses, etc.) found on top of the soil

litter - garbage disposed of incorrectly

loam - a soil texture which consists of equal acting parts of sand, silt, and clay; generally comprised of about 40% sand, 40% silt, and 20% clay

magma - naturally occurring molten rock

metamorphic - describes any rock derived from pre-existing rocks in response to large changes in temperature, pressure, or other environmental factors

mineral - a naturally occurring inorganic (non-living) substance having an orderly internal structure and characteristic chemical composition and other physical properties

mottles - spots or blotches of colors different from the main subsoil color

nonpoint source pollution - pollution emanating from disparate, hard to identify sources

old growth forests - forests containing trees that are often hundreds, sometimes thousands, of years old; examples include forests of Douglas fir, western hemlock, giant sequoia, and coast redwoods in the western U.S.

organic matter - dead and decaying plants, animals

parent material - the layer of very little weathering from which other soil layers develop

ped - the smallest unit of soil

permeability - the rate at which water moves down through the subsoil

photosynthesis - the process by which chlorophyll-containing tissues of plants use light and carbon dioxide from the atmosphere to produce glucose and oxygen; the process by which plants clean the air by taking in pollutants and gases through their leaves and roots and convert them to harmless substances

plateau - an elevated area of relatively flat land. It is often limited on at least one side by an escarpment, or an abrupt drop to lower ground

plutonic - describes igneous rocks formed deep beneath the earth's surface

point source pollution - pollution emanating from and traceable to a distinct point of origin

pollution - the addition of unwanted substance to or the alteration of the environment in a way that adversely affects human health or living systems. Pollutants may be biodegradable, non-biodegradable, or slowly degradable.

pollution prevention - the reduction or elimination of pollutants prior to removing off-site for recycling, treatment, or disposal. P2 (as it is called) can include substitution of different raw materials, reduction of toxic chemical use, and increased recycling or treatment of wastes. Companies often find reduced costs for raw materials, energy, pollution control, and waste disposal, while fewer pollutants are discharged into the air, water, or land. Preventing pollution improves the environment today and may help prevent tomorrow's problems.

pulp - fibrous material prepared from wood, recovered paper, cotton, and grasses by chemical or mechanical processes; used in making paper or cellulose products

pulpwood - timber that is cut and made into pulp for paper and other products

Quinine - a drug used to cure and prevent malaria that comes from Peruvian bark

reforestation - the renewal of forest cover by natural regeneration or the planting of seeds or seedlings

resin - a substance from trees used to make varnish, lacquers, inks, and plastics

riparian buffer - a zone of vegetation along a river or stream corridor that offers wildlife habitat and helps absorb runoff from the land during storm events

runoff - water lost by surface flow

saltwater intrusion - occurs when groundwater supplies are depleted to the extent that coastal waters infiltrate local aquifers

sapwood - the younger, softer, living, or physiologically active outer portion of a tree's wood that lies between the cambium and the heartwood and is more

permeable, less durable, and usually lighter in color than the heartwood. The tree's water and nutrient needs are transported within the sapwood.

sedimentary - describes a layered rock resulting from the consolidation (cementing) of sediment

seedling - a young tree grown from a seed up to a small sapling

selective cutting - the cutting of intermediate-aged, mature, or diseased trees in an uneven-aged forest stand, either singly or in small groups. This encourages the growth of younger trees and maintains an uneven-aged stand.

shelterwood cutting - the removal of the understory of a forest so that younger saplings can grow in the shade of older and larger trees

sick building syndrome - term used to describe the effects of high levels of indoor air pollution

side effects - term used to describe conditions resulting from (or reactions to) exposure to health hazards, toxins, chemicals, and drugs

silt - soil deposits caused by water run-off; one of the three particle sizes found in soil, between sand and clay in size

silviculture - management and cultivation of forests

skidder - a large machine that drags harvested wood from the forest floor to a loading area

slope gradient - the rise or fall of the land

soil profile - a cross-section cutting down through the different soil layers or horizons

soil structure - the manner in which individual soil particles are grouped together

soil texture - the relative proportion of sand, silt, and clay found in a soil; the feel of the soil

subsoil - a soil layer under the topsoil and above the bedrock

succession - used here to describe forest communities; the natural evolution (or cycle) of birth, growth, maturity, and death

sustainable use - managing resources so that they produce continuously, unimpaired by periodic harvests

tannin - chemical used to tan leather; found in many trees

terracing - making a long pile of earth with sloping sides and a flat top; usually done along rivers to control flood waters

timber cruise - a survey of a forest or forest stand to mark trees to be harvested

topography - the general description of a land surface including its relief and the position of natural and man-made features

topsoil - the upper layer, "A" horizon of soil in which plants grow; usually richer in plant food than the subsoil; the plowed layer

water pollution - sewage, industrial chemicals, heavy metals, and household cleaners are examples of materials commonly discharged into streams and rivers. In addition, chemicals from the air dissolved in rainwater, pesticides, and fertilizers leached from the land run off into water

watershed - land area that collects and channels water to a common outlet. Each lake, river, and stream collects its water from the surrounding watershed.

weathering - all physical and chemical changes produced in rocks and soils by the forces of climate

windbreak - a row of trees which serve as protection from the wind

xylem - the complex woody tissue of higher plants that includes systems for transporting water storing nutrients, and structural support

Associated Science Standards of Learning

Kindergarten

K.10 The student will investigate and understand that materials can be reused, recycled, and conserved. Key concepts include:

- identifying materials and objects that can be used over and over again;
- describing everyday materials that can be recycled; and
- explaining how to conserve water and energy at home and in school.

Grade One

1.2 The student will investigate and understand that moving objects exhibit different kinds of motion. Key concepts include:

- objects may have straight, circular, and back and forth motions;
- objects vibrate; pushes or pulls can change the movement of an object; and
- the motion of objects may be observed in toys and in playground activities.

1.3 The student will investigate and understand how different common materials interact with water. Key concepts include:

- some common liquids (vinegar) mix with water, others (oil) will not;
- some everyday solids (baking soda, powdered drink mix, sugar, salt) will dissolve, others (sand, soil, rocks) will not; and
- some substances will dissolve easily in hot water rather than cold water.

1.4 The student will investigate and understand that plants have life needs and functional parts and can be classified according to certain characteristics. Key concepts include:

- needs (food, air, water, light, and a place to grow);
- parts (seeds, roots, stems, leaves, blossom, fruit); and
- characteristics: edible/nonedible, flowering/nonflowering, evergreen/deciduous.

1.5 The student will investigate and understand that animals, including people, have life needs and specific physical characteristics and can be classified according to certain characteristics. Key concepts include:

- life needs (air, food, water, and a suitable place to live);
- physical characteristics (body coverings, body shape, appendages, and methods of movement); and
- characteristics (wild/tame, water homes/land homes).

1.6 The student will investigate and understand the basic relationships between the sun and the Earth. Key concepts include:

- the sun is the source of heat and light that warms the land, air, and water; and
- night and day are caused by the rotation of the Earth.

1.7 The student will investigate and understand the relationship of seasonal change and weather to the activities and life processes of plants and animals. Key concepts include:

- how temperature, light, and precipitation bring about changes in plants (growth, budding, falling leaves, wilting);
- animals (behaviors, hibernation, migration, body covering, habitat); and
- people (dress, recreation, work).

1.8 The student will investigate and understand that natural resources are limited. Key concepts include:

- identification of natural resources (plants and animals, water, air, land, minerals, forests, and soil);
- factors that affect air and water quality;
- recycling, reusing, and reducing consumption of natural resources; and
- use of land as parks and recreational facilities.

Grade Two

2.8 The student will investigate and understand that plants produce oxygen and food, are a source of useful products, and provide benefits in nature. Key concepts include:

- important plant products (fiber, cotton, oil, spices, lumber, rubber, medicines, and paper);
- the availability of plant products affects the development of a geographic area; and
- plants provide homes and food for many animals and prevent soil from washing away.

Grade Three

- 3.4 The student will investigate and understand that behavioral and physical adaptations allow animals to respond to life needs. Key concepts include:
- methods of gathering and storing food, finding shelter, defending themselves, and rearing young; and
 - hibernation, migration, camouflage, mimicry, instinct, and learned behavior.
- 3.6 The student will investigate and understand that environments support a diversity of plants and animals that share limited resources. Key concepts include:
- water-related environments (pond, marshland, swamp, stream, river, and ocean environments);
 - dry-land environments (desert, grassland, rainforest, and forest environments); and
 - population and community.
- 3.9 The student will investigate and understand the water cycle and its relationship to life on Earth. Key concepts include:
- the origin of energy that drives the water cycle;
 - processes involved in the water cycle (evaporation, condensation, precipitation); and
 - water supply and water conservation.
- 3.10 The student will investigate and understand that natural events and human influences can affect the survival of species. Key concepts include:
- the interdependency of plants and animals;
 - human effects on the quality of air, water, and habitat; the effects of fire, flood, disease, erosion, earthquake, and volcanic eruption on organisms; and
 - conservation, resource renewal, habitat management, and species monitoring.
- 3.11 The student will investigate and understand different sources of energy. Key concepts include:
- the sun's ability to produce light and heat energy;
 - natural forms of energy (sunlight, water, wind); fossil fuels (coal, oil, natural gas) and wood;
 - electricity, nuclear power; and
 - renewable and nonrenewable resources.

Grade Four

- 4.2 The student will investigate and understand that energy is needed to do work and that machines make work easier. Key concepts include:
- energy forms (electrical, mechanical, and chemical energy);
 - potential and kinetic energy;
 - simple and complex machines; and
 - efficiency, friction, and inertia.
- 4.5 The student will investigate and understand how plants and animals in an ecosystem interact with one another and the nonliving environment. Key concepts include:
- behavioral and structural adaptations; organization of communities;
 - flow of energy through food webs; habitats and niches;
 - life cycles; and
 - influence of human activity on ecosystems.
- 4.8 The student will investigate and understand important Virginia natural resources. Key concepts include:
- watershed and water resources;
 - animals and plants, both domesticated and wild;
 - minerals, rocks, ores, and energy sources; and
 - forests, soil, and land.

Grade Five

- 5.4 The student will investigate and understand that matter is anything that has mass; takes up space; and occurs as a solid, liquid, or gas. Key concepts include:
- atoms, molecules, elements, and compounds;
 - mixtures and solutions; and
 - effect of temperature on the states of matter.

- 5.6 The student will investigate and understand characteristics of the ocean environment. Key concepts include:
- geological characteristics (continental shelf, slope, rise);
 - physical characteristics (depth, salinity, major currents);
 - biological characteristics (ecosystems); and
 - public policy decisions related to the ocean environment (assessment of marine organism populations, pollution prevention).
- 5.7 The student will investigate and understand how the Earth's surface is constantly changing. Key concepts include:
- the rock cycle including the identification of rock types;
 - Earth history and fossil evidence;
 - the basic structure of the Earth's interior plate tectonics (earthquakes and volcanoes);
 - weathering and erosion; and
 - human impact.

Grade Six

- 6.1 The student will plan and conduct investigations in which:
- observations are made involving fine discrimination between similar objects and organisms;
 - a classification system is developed based on multiple attributes;
 - differences in descriptions and working definitions are made;
 - precise and approximate measures are recorded;
 - scale models are used to estimate distance, volume, and quantity;
 - hypotheses are stated in ways that identify the independent (manipulated) and dependent (responding) variables;
 - a method is devised to test the validity of predictions and inferences;
 - one variable is manipulated over time with many repeated trials;
 - data are collected, recorded, analyzed, and reported using appropriate metric measurement;
 - data are organized and communicated through graphical representation (graphs, charts, and diagrams); and models are designed to explain a sequence.
- 6.3 The student will investigate and understand sources of energy and their transformations. Key concepts include:
- potential and kinetic energy;
 - energy sources (fossil fuels, wood, wind, water, solar, and nuclear power); and
 - energy transformations (mechanical to electrical, electrical to heat/light, chemical to light, and chemical to electrical/light).
- 6.5 The student will investigate and understand that all matter is made up of atoms. Key concepts include:
- atoms are made up of electrons, protons, and neutrons;
 - atoms of any element are alike but are different from atoms of other elements; and
 - historical development and significance of discoveries related to the atom.
- 6.9 The student will investigate and understand that organisms depend on other organisms and the nonliving components of the environment. Key concepts include:
- producers, consumers, and decomposers;
 - food webs and food pyramids; and
 - cycles (water, carbon dioxide/oxygen, nitrogen).
- 6.10 The student will investigate and understand the organization of the solar system and the relationships among the various bodies that comprise it. Key concepts include:
- the sun, moon, Earth, other planets and their moons, meteors, asteroids, and comets;
 - relative size of and distance between planets; the role of gravity;
 - revolution and rotation;
 - the mechanics of day and night and phases of the moon;
 - the relationship of the Earth's tilt and seasons;
 - the cause of tides; and
 - the history and technology of space exploration.
- 6.11 The student will investigate and understand public policy decisions relating to the environment. Key concepts include:
- management of renewable resources (water, air, plant life, animal life);
 - management of nonrenewable resources (coal, oil, natural gas, nuclear power); and
 - cost/benefit tradeoffs in conservation policies.